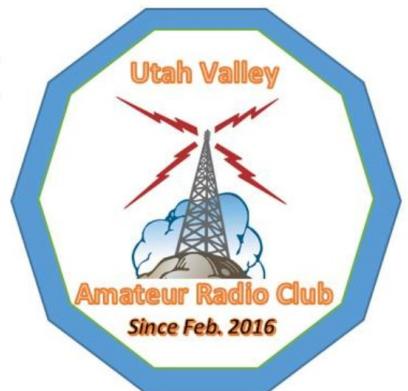


Brass Tacks

An in-depth look at a radio-related topic



Proper grounding, in a nutshell

In past club meeting presentations, newsletter articles, and elsewhere, we've discussed grounding: what to ground, how to ground, and the reason for grounding. And yet, it occurs to me that one reason questions keep arising is the lack of a tangible, big-picture grounding demonstration. I decided to try and fill that void by creating just that, a somewhat complete, portable grounding visual aid.

On your roof

If your rooftop antenna is installed on a mast, like the open-stub J-pole pictured here, your mast will need to be grounded, according to the NEC (National Electric Code). You



can ground your mast by connecting a heavy (6 AWG minimum) ground wire between your mast and your ground rod, using grounding clamps on both. If your mast isn't connected to your antenna base, you should connect the ground wire to both the mast and the antenna base.

The ground below

As directly below your antenna mast as possible, you need to drive an eight-foot ground rod into the dirt, and attach your ground wire to it. You might find that your yard contains more rock than dirt, preventing you from dri-

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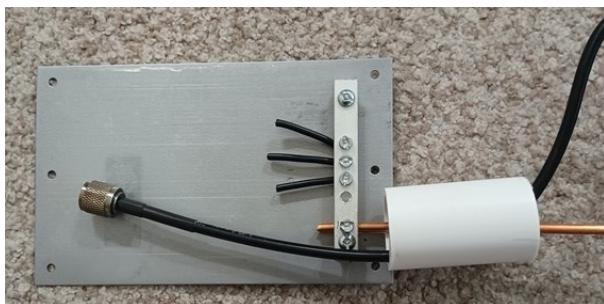


ving your rod all the way in. In that case, you can either drive your rod in at an angle, or simply cut your rod short after you've driven it down as much as you could.

Locate your *electrical service*, or the place where your electrical power enters your home. Drive one ground rod for every 16 feet between your antenna ground rod and your electrical service, then **bond** them all to your service by attaching grounding wires between all of them and your service. All your ground rods and connecting grounding wires should be buried in the dirt.

In your shack

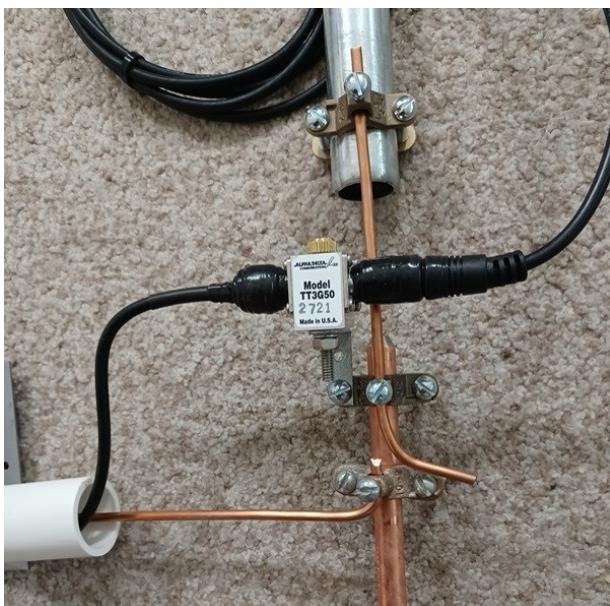
The short piece of PVC on the model represents your house wall, where your coax and ground can enter. You should get hold of a thick sheet of steel or copper and mount it on your shack wall or desk. This is known as your *ground panel* or *ground plate*. Then, install a grounding bus bar to the plate. Attach a thick grounding wire between your ground rod outside and your grounding bus bar.



All your AC-powered shack equipment can be grounded to this single plate, which will provide the safety ground and yet prevent ground loops, caused by daisy-chaining equipment grounds. Each of the little, black wires protruding from the grounding bus bar in the model represent each wire that connects to your power supply, amplifier, and other AC-powered shack equipment.

If you live on the second floor, or find it oth-

erwise impossible to connect your outdoor ground wire to your shack ground plate, simply connect the plate to the ground pin of your nearest room outlet instead.



On the ground rod nearest your shack, install a **surge suppressor** (or *lightning arrester* or *antenna discharge unit*, depending where you read it) onto your ground rod. On my own house, I use one that has SO-239 connectors for the coax connections and a stud for the ground connection.

Routing of your coax

Once you connect your coax to your antenna, form an **RF choke** by coiling your coax in six turns of six-inches in diameter *if your coax is RG-8X*. Tie the loops together and to your mast with UV-proof zip ties. Connect the other end to one side of your surge suppressor. Connect a length of coax from the other side of your suppressor, through your house wall, and into your shack. It doesn't matter that you run your coax alongside your ground wire anywhere along their paths; they'll neither help nor interfere with each other.



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continued



Although my little model uses RG-8X, I actually recommend [LMR-400](#) if your coax is longer than, say, 50 feet.



Just outside your house entrance, I highly recommend forming a drip loop for your coax, one thing missing from my little model.

Finally, wrap all exposed coax connectors with silicone tape, such as [Stretch-and-Seal](#), and avoid using electrical tape, except only for temporary uses. Once applied, silicone tape should keep out moisture, prevent UV damage, and is easy to remove, if needed.

Will it work?

I'm hoping that I can use this little demo to show people how their entire grounding solutions should appear on a miniature scale, if they're done properly. Obviously, each



grounding configuration will have to be tailored for each individual rooftop application, but I believe this model should answer many questions regarding proper grounding.



My actual shack ground rod, plus surge suppressors for my VHF and HF antennas. Notice the two 4 AWG bare copper wires going into the ground to the antenna and to my service. The braid is my ground connection to my indoor ground plate.

The short piece of grounding wire in the model tailing off the ground rod, opposite the PVC is merely a suggestion of where your ground wire continues to bond to your next ground rod, and eventually, to your service.

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